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Plantation Strategy

By H. P. AGEE,
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(Excerpts from a paper submitted at the Fifty-third Annual Meeting of the Hawaiian Sugar Planters' Association. This scholarly paper is arousing considerable comment since its principles may be applied equally well to other human affairs, as well as that of plantation management.)

The word *strategy* is gradually finding its way into discussions of plantation affairs. It is a term that promises to be useful. It supplies a name for a very vital part of our activities, that of well coördinated planning to take full advantage of our resources and opportunities. It applies particularly where the resources are evaluated to be effectively combined.

In presenting the general subject for consideration, this paper divides it into two parts. The first part deals abstractly with strategy and attempts to set forth the fundamental meaning of the term.

The second part of the paper attempts to show how the principles as set forth in the first part may be considered in application to the problems of the sugar plantation.

The art of sugar production has its finer points that are yet to be developed. These are to be better understood when we know more of the relation of strategy to industry. The full significance of this relationship is not to be realized until, as a comparative study, we carry our subject into its various fields of application.

When we seek a basic understanding of a subject there is real need to study it comparatively. Years ago, in writing of biology, Le Conte brought this out rather clearly when he said: "Anatomy became scientific only through comparative anatomy, physiology through comparative physiology, and embryology through comparative embryology." He felt that sociology and psychology were to be placed upon firmer planes of understanding when approached as comparative sociology and as comparative psychology. This "method of comparison," he said, " . . . is the great method of research in all those departments which can not be readily managed by method of experiment."

This paper, then, will develop the idea of *comparative strategy*, if only in the unfinished way that characterizes the pioneer attempt. Comparative strategy, as a subject, is as broad as human affairs. Players of games, explorers in science, masters of war, captains of industry, in being concerned with it, will become concerned in some degree with each others' affairs as a means to reach an apt understanding of their own.

Generalship in all lines of activity will be found to have much in common, so it is not strange that one finds, on the part of a number of individuals, a tendency to translate the problems of the plantation into analogies with the military campaign.

As an example of strategy on the sugar plantation, we may cite recourse to harvesting, ahead of its regular schedule, drought-stricken cane last year and this year on the islands of Hawaii and Maui.

We shall not stop to speak of the advantages of this, nor to explain why this is a strategic measure. This will become apparent as the subject is developed.

The systematic use of pre-harvest cane samples to designate those fields which may be given preference in harvesting on account of superior juice quality, clearly constitute another example.

Another instance is that of a plantation that operates under abnormally low water supplies and meets this difficult situation by recourse to short-cropping on account of the water economy thus afforded.

Still another instance is that of plantations that are normally short of water in

late summer and relieve this shortage by harvesting crops of short lengths after June.

This year we find a plantation placing its off-season in midsummer in order to divert its fluming water to much-needed irrigation.

These are instances of resourcefulness that properly fall within the scope of industrial strategy. Yet strategy goes much further, for we shall find that all phases of sugar production may well be considered and interrelated on the basis of the strategic values that obtain throughout our activities. . . .

Part 1: The Meaning of Strategy

Human affairs are subject to the influence of chance, of precedent, or prejudice, of strategy. Strategy is often misconstrued to apply largely, if not entirely, to ruse or artifice. Strategy may, upon occasion, employ a ruse, but fundamentally strategy is something else.

"Strategy is the art of using available resources to attain a definite objective." That, with the change of a word or two to give it a general application rather than a purely military one, was von Moltke's definition.

Strategy is discussed nowadays in relation to many of our affairs, and while borrowed, it is true, from the military, it is not uncommon to hear of it in connection with a whole range of subjects that are far removed from warfare and the deployment of troops.

We speak of "the strategy of a political campaign," we hear of "strategy in football," there is a book called "The Strategy of Great Railroads," another "Chess Strategy." The other day I picked up a pamphlet on the "Strategy of Ping Pong," and if this seems ridiculous, we can site a more sublime application, for a booklist of a certain publishing house includes "Strategy of the Devotional Life," and "The Strategic Value of Prayer."

These sundry applications are mentioned merely to indicate that we may discuss strategy without the feeling that in doing so we are becoming militaristic in our viewpoint.

Yet, to understand strategy even as we may deal with it in our everyday affairs, we turn inevitably to the battlefield and the chessboard, where, admittedly, all that takes place is closely related to strategy or its influences.

Johnstone, of the University of Edinburgh, who lectured on military science, tells us in his book on the "Fundamentals of Strategy" that strategy "deals with movements and positions of armies up to the time when the *next movements* will bring about the collision. Grand tactics are those next movements of the units of the army. Fighting tactics include the methods which a unit employs when it has had its task assigned to it, and has come to grips with the enemy. Minor tactics are the activities of a unit through all its movements and stationings."

There are borderlines, difficult to define, between policy and strategy, and again between strategy and tactics. An authority tells us that "policy and strategy are bound together by an indestructible link."

On the plantation we irrigate in order to produce sugar. Irrigation is not an objective, but a means to an end, a step toward our objective. It rains: we omit irrigation in favor of the more economical substitute, the alternate leads equally well to the main objective.

We apply potash to produce sugar. We find that our soil contains more potash than the cane can use. If we are positive of this we omit potash in favor of the cheaper substitute. The objective is to produce sugar profitably, not to use complete fertilizer as an expression of "good farming." If we are doubtful about the natural potash of the soil, we weigh this doubt, weigh the probable cost of loss in sugar against cost of potash needed to make sure. We decide perhaps upon precautionary use of potash in moderate amount.

We apply fertilizer, we hoe weeds, that the cane may grow and produce sugar. These are means to an end. When the

cane attains a certain age, weed control continues without expense by reason of the shade produced by the cane itself. The sooner and more liberally we fertilize, the sooner does this shading take place, and the sooner does the expense of weed control cease. But the fertilizer, it is argued, makes the weeds grow too. Here the strategist, remembering the principle of *"full strength,"* that of concentrating at a given point, at a given time, the force necessary to attain the purpose in hand, effectively combines liberal fertilization and effective control of weeds for the brief essential period, rather than loosely to attack the issue for a longer time at greater expense. The strategy of weed control is not, however, a simple issue, and more needs to be said about it. . . .

We learn from Lasker's "Manual of Chess" that Steinitz's investigation "starts from the principle that a plan must have a reason." He felt that "a plan, being a prescription or rule for successful action on the chessboard, could *not* be based on the reason ascribed to it during his time, namely, the genius of the player, the creative fancy of a master, but another reason . . . , namely, a *valuation.* He felt this, and this sentiment led him to write his theory. . . . The world did not comprehend how much Steinitz had given it . . . yet his thought was revolutionary, because, of course, it is not limited to the chessboard—the royal game, after all, is of slight importance—but it extends to every activity directed toward meaning and purpose . . . Chess . . . is no exception to a thousand or a million other games that have been or could be invented. What is true of chess must hold by analogy for other games. And games being, at least in intent, a remodelling of Life, simplified to be sure, but still resembling it in essentials—there has to be an analogy between games and Life. At last, then, every activity directed by rules and having a meaning and a purpose, such as, for instance, a dispute between persons taking different sides of a question and applying logical rules in their argument, every such activity, without exception, has to follow the very same fundamental principle which Steinitz discovered as governing in the game of chess. And if this principle can simplify our search for combinations, though their number be millions, it must have the power also of guiding our search for suitable and efficient action."

"This fundamental and universal principle may be briefly expressed as follows: *the reason for a masterly plan is always a valuation.*

"To value, to valuate, to judge, to estimate a thing does not pretend to exact knowledge. But *knowledge by estimate, by judgment, by valuation, though not exact,* according to the principle of Steinitz, is *still an effective guide. . . .*"

The foregoing statements have been emphasized with italics, of our own placing, to designate their importance. They are not to be passed by lightly. Their brevity and simplicity should not cause one to overlook their profound significance, their great breadth of application.

We have here a statement of underlying principles that enables us to say: *Strategy is plan of action based on values.*

Lacking precise values, the next best recourse is plan of action based on estimates. Since so great a part of the values commonly used falls short of absolute precision, it may be said we deal largely in estimates of greater or less refinement.

Plan of action that omits consideration of values does not escape the fact that values exist, and assert their presence, even though they have been disregarded.

This leads us to the point of saying that values rather roughly estimated are better than values ignored. The greater the accuracy in estimated evaluations, the greater the reliability of their guiding influence. False values sometimes enter into our reasoning by grace of some time-honored position they have held. In point of strategic planning such values are to be dropped in favor of estimates that tend in the right direction, however roughly. (An example of faultiness in values in common use in sugar production is that of

dividing cost of water to different fields on the basis of the number of man-days employed in irrigation. This custom ignores the well-known fact that some of these man-days employ four acre inches of water, others twelve to fifteen. Plans of water utilization, based on such values, may be faulty plans.)

If we accept the statement that strategy is plan of action based on values, we bring about a great clearing-house of understanding. We know without further discussion why strategy applies to all affairs based on plan and reason, we know strategy in all things is fundamentally the same. All the foggy explanations of strategy begin to clear; all the varied forms of strategy lose their mystery and arrange themselves in their well-ordered relationship; all the definitions of strategy adjust their differences, and lead, like the roads to Rome, to a common center of enlightenment.

Values pertain throughout human affairs; strategy is the business of dealing in values collectively, comprehensively, understandingly; and therefore strategy has important and interesting application to all that we do.

Part II: The Application of Strategy on the plantation includes the following divisions—Values in Irrigation, Values in Fertilization, Sugar Production: A Contest Against Time, The Theory of Contest, Positional Values, The Evaluation of Values, Values in Planning, Values in Variation, Crop Length Values, Interplay of Values, Weed Control Values, Values in Cane Varieties, Basic Cost Values, Strategy Under Quota, Values in Research, Recapitulation. The last two divisions are given here in full.

VALUES IN RESEARCH.—Research is undertaken to gain new information. It is, in a way, a contest to move the boundary line of human knowledge a little further into the unknown territory. But since the new information or new knowledge that we seek has particular interest for us only if it is gained within some tangible length of time, research is, in a sense, perhaps in a rather peculiar sense, a contest against time. It is a contest where haste is not to make waste, but when the necessary precautions of accuracy of method, and careful review of findings have been adequately established and amply secured, research must, in final analysis, take full and reasonable consideration of the time factor. It is a race, a very careful and painstaking race, to gain new information in a reasonable tangible length of time.

It is not enough that the investigator be interested for an indefinite period. This is not research as we desire to have it, for that, seemingly, is effort without objective.

In discussing the subject of this paper, a recent visitor in Honolulu, Dr. George O. Burr, of the University of Minnesota, said: "I am interested in your definition of strategy, 'plan of action based on values,' because that is what research is."

Research, then, as plan of action based on values, is primarily concerned with objective. We may hold in mental reserve, as the ultimate objective of fine research, "the unknown objective," the prize of great value to be discovered along the way, the Western Hemisphere that blocks the path that seeks the shorter route to India. Research shall be characterized by an alertness to find prizes, great or small, wherever they may occur, and likewise influenced by the conviction that they are not likely to be found in aimlessly sailing about the sea. We should be prepared to swerve the direction of our undertaking toward the newer, seemingly richer, objective that looms upon the horizon, if it clearly indicates a tangible degree of promised value; but we should be on guard against the mirages that keep us turning one way, then another, to the detriment of progress.

"Unswerving resolution," applied to the attainment of objective, is to be tempered or conditioned under the viewpoint as stated, in its application to research. The objective in research, then, may be reckoned as a "sub-objective" (if we are will-

ing to use the term), as a step toward the further goal; but, when all is said, this designation, in the last analysis, is to be applied to all human knowledge in that each bit of it may be counted as an aid to attain a little more that lies beyond.

In research we want objective, we want action based on values, we want plan of attack, yet in difficult circumstances we want to remember the dictum of a famous general: "Time spent in reconnaissance is never wasted." Still, the skirmish, the reconnoitre, is to have a purpose, an objective.

The investigator seeks information; it may be specific information to be applied in a specific way, it may be general or fundamental information, the application of which must await developments, await the discovery of ways in which it can be used. As has been said before: "We make progress as we gain more information about the cane plant and its environment; likewise we make progress as we find new ways to use the information that we have."

A faulty thing about research in agriculture and plant life generally, in the United States (we omit consideration of foreign fields), is that it is rather loosely planned. This is not so much a criticism as it is the echo of self-criticism on the part of some of America's leaders in research who are striving to build for this type of research a background of well-coördinated planning.

Can we do less for our local sphere of interest? Can we as a center of some of the world's best agriculture, outline clearly, comprehensively, economically, a relation of research to that agriculture? If so, the research cannot be considered as a thing apart from the agriculture.

We have the field of action which is to be based on values. Where these values are uncertain and questionable ones, research or investigation, of one form or another, is the means to strengthen them to the point of making them real and useful. This investigational activity needs to be an industrial activity based upon an industry's need to know more about its affairs for the sake of the economic use that can be made of this information.

Enough splendid work has been done by our individual plantations to establish the fact that the Hawaiian sugar plantation is concerned to know more about its affairs. The "intelligence department" of the sugar plantation, the "G-2"* of sugar production, is in the future to be more and more an integral part of each individual plantation, to work upon the individual requirements, the pertinent values of the plantation unit.

The central organization in the form of an experiment station should, logically, deal with the broader and more general phases of investigation that can be more advantageously, or more economically handled on the basis of the group activity operating through a central staff. This staff should outline what it considers to be the requirements of the industry in major projects of research, and the investigators assigned to these should have the necessary freedom from other demands to carry them on to logical end-points. The plantation personnel should have interest in these projects and the potentialities they hold, and the station personnel should have interest in the general background of values that the plantation uses or needs to have available for its use.

At this point I would read into the paragraph what has been said on the "evaluation of values," and I would apply the idea as far as it may appropriately extend to the affairs of the industry. There we have in prospect a framework for the whole range of information that is needed. There, in stated facts and estimated values, we would undertake to codify what we know, what we estimate, what we guess, about sugar cane agriculture, and then we indicate as lacunas the dark areas on which we are unwilling to venture the guess.

Thus there develops the setting that by

*U. S. Army designation for "intelligence" activities.

the very nature of its values reveals or indicates our requirements in research. Our knowledge lines up as assets on one side, our ignorance, as liabilities, takes the hostile position. Remembering the principles of contest, we seek the weakness in that position as "the target for attack."

RECAPITULATION.—In recapitulation, it may be said that underlying strategy there are simple fundamental principles of far-reaching importance. It is held that the superior plan is not something to be conceived in the mind of man, but that it exists as a result of stress or lack of balance in the interplay of forces that have pertinent bearing. "The reason for a plan is a valuation" or the resultant of interrelated values, and "the reason for a valuation is again—values."

The chess player, the military general, the man of affairs, the planter, the engineer, the scientist, are on common ground, in that the superior plan of each is to be sought from positional values of pieces upon the board of the individual game of his respective calling. Each, if he has the acumen that makes him a strategist, will be aided by his special training and experience to determine and estimate his values, and to visualize the plan that these values reveal to him. He selects but does not create his objective, and he discovers, not in his mind, but from his evaluations, the plan by which that objective may be attained.

There will be those to say that men have always dealt with values in their planning. It must be conceded that this is partly true but only true in part.

Some values very positively govern our actions. Others, less obtrusive, may or may not be overlooked. The values that must be *sought,* painstakingly determined or wisely estimated, are the ones so often disregarded.

If strategy is plan of action based on pertinent values, directed toward a logical objective, we must be prepared to admit that in some degree strategy is a common possession of man and animal. In primitive circumstances, strategy is displayed in measures of self-defense and pursuit of food. There is nothing new about strategy, save thousands of new ways in which it may be used. As to the age of it, Keith Henderson pictures a prehistoric time when the ice of the fourth glacial period is descending upon Europe. Some species of animals are finding their way south, others are perishing, never to be seen again. Mousterian Man, that borderline type between brute and human, if he is to survive, must find shelter in the caves, and to do this he must contend for their possession with the great bears of that period. Drawing upon his imagination, Henderson reconstructs the strategy that must have been resorted to by primitive man in meeting his vital problem to exist. Another writer, Crile, tells us that "the young of monkeys, whose survival depends upon adaptation to continual alertness, receive from their parents a careful training in strategy."

Having departed from the simple operations of the primitive school and having built around us a vast complexity of interrelated values in our pursuit of food, shelter, happiness, our native strategy continues to function; but (rare cases excepted) it does not automatically measure up to the complexity of forces we have put about us.

We educate ourselves in all the separate specialties of this complexity, but we stop short of specializing in the art of combining its separate phases into a uniform, smoothly working whole. We make occasional, possibly frequent, applications of strategy to many fields of effort, but in what others than war and a few games do we make open recognition of the need of strategy and a thoroughgoing attempt to apply it to our affairs?

The difficulty with the world today is patently not a lack of material resources, nor the better things that science and engineering can give us. Is it that with all these things about us we have been forgetful of the example set by the monkeys and have not troubled to teach either our

youths or ourselves the art of using available means to attain the objectives that we have in view? Does not all that we may do begin and end with positional values of the pieces on the board and plan of action based upon these values?

Undoubtedly we may use strategy without thinking in terms of strategy, but it is likely that a knowledge of these terms of thought will result in better strategy, better capacity to attain our ends.

There is lack of clear comprehension of the meaning of strategy. Some authoritative writers on the subject omit to tell us what strategy really is. It is not generally known that strategy in all things is founded on common principles universally applicable. A realization of this will be helpful, in various lines of activity, to develop and carry out what President Roosevelt has termed, "the well grounded, well rounded plan."

The National Recovery Act in Hawaii

A plan of coöperative attack on economic problems which he believes will command the natural adherence of all parties was outlined by Lt. Col. Allen W. Gullion, new NRA deputy administrator for Hawaii, in his first public address on December 19 over a KGU-KGMB joint program, Honolulu.

Col. Gullion forecast an association in Hawaii that will divorce the national recovery program from factional issues, racial strife or industrial conflicts. He was introduced to the radio audience by Governor Lawrence M. Judd.

Col. Gullion's plan for territory-wide codification, based on broad advisory schemes which will include representatives of all interested groups, contemplates:

1. Immediate action by various chairmen of island boards, calling for submission of tentative codes for each industrial group.

2. Territorial codes, framed by representatives of each island, based on these tentative codes.

3. Hearings for each code before it is adopted, at which all interested groups may present criticisms.

4. A general territorial set-up, in which the NRA deputy administrator will preside at hearings and disputes, to which representatives of all groups concerned will be invited.

Gullion's address follows substantially:

"I have faith in these islands and shall now, very briefly, give a reason for that faith. My first visit to Honolulu was in February, 1906. In 1911 I lived here almost a year. On my latest arrival, a year and a half ago, my first reaction was one of pride that I belonged to a race that had taken the lead in the building of this modern city in which beauty, permanence and utility have been the triune ideal.

"My later and deeper reaction, on longer residence and closer insight, was also one of pride, but it was a pride that had enlarged and flowered from a racial pride into a community pride. Many of the people of Hawaiian blood became my personal friends and I learned to value highly their many fine qualities—hospitality, generosity, tolerance, love of beauty.

"With interest and with growing admiration, I studied the great Oriental populations here. Their diligence, their sobriety, their devotion to family, are an example to any people. I have sympathized with the problems of the new Americans, the young Hawaiian-born citizens of Oriental ancestry—alert, clean, borne upward above discouragement by a decent self-respect and the wings of honorable ambition.

"These three groups, Haole, Hawaiian, and Oriental, have lived side by side in peace when general history would have led us to expect internecine conflict; they have maintained a patient self-control in crises which, in older lands and more homogeneous civilizations, have often

been passed only with riot and much bloodshed.

"In giving a reason for my faith in Hawaii, I have sufficiently indicated my social approach to my new duties. My political approach is neither Democratic nor Republican. It is very simple. For 18 months I have studied the constitutional relation of Hawaii to the remainder of the U. S. There is no doubt that this territory is an integral part of the U. S. It has cheerfully borne its share of the federal burden in peace and war; it is entitled to its share of federal benefits. That's all the politics this job needs.

"My economic approach may be briefly stated. I am free from any affiliation with and from any partiality for, either industry or labor. NRA does not enter Hawaii as the champion of employer or of employee. It is here for the prosperity and harmony of all. If it does not help bring normal general prosperity it will have failed. If turbulent discord results from its activity, NRA may hardly be called a success.

"In the discharge of my duties I am fortunate in having two able and honorable advisers, Dr. A. L. Dean and Mr. Harold Dillingham. In Washington, the national administrator has established a labor advisory board and a consumers' advisory board. I shall appoint similar boards of three members each for our work here, and I now invite suggestions from labor and from consumers as to the composition of such boards. The board members will serve without compensation, just as Dr. Dean, Mr. Dillingham, and I, are serving. Despite the fact that the service is uncompensated and voluntary, there should be at least one man on the labor board who eats his bread in the sweat of his brow, and the consumers' board should contain at least one woman, who, on the bread-winner's meager salary, clothes and feeds her children.

"Irrespective of whether certain mainland codes will be held to be applicable here—and these are matters upon which we are hourly expecting instructions—our first and immediate steps are clearly indicated. This is what to do: The NRA chairmen on each island will call upon each trade or industry group on his island to form a trade association for the purpose of submitting a tentative code for that industry.

"Based upon these tentative island codes, a territorial code for each industry will be framed by representatives from all the islands. These territorial codes will be operative throughout the territory. Before a territorial code is finally adopted, each industry and business affected, large and small, citizen and alien, will be afforded full opportunity to be heard. The deputy NRA administrator will aid in the formation of the codes and will conduct the hearings.

"If any industry, through inertia or for any cause, fails to propose a code, it will eventually find itself subject to a code prescribed for it by the president. Let each industry take the initiative at once!

"At the proper time I shall make public the president's regulations as to compliance and enforcement."

Pineapple and Health

By WILLIAM H. MOLLER, Singapore

(Specially written for the "Philippine Journal of Commerce")

This is an interesting theme for those Europeans who are living in the tropics, because the pineapple is a tropical fruit.

The expensive experiments in European hothouses (i.e., Dresden, Germany, etc.) are of no importance at all, as a hothouse plant never has the same quality (aroma, fruitsugar-percentage) as a fruit grown under the open skies and natural conditions.

One would think that the pineapple fruits which the progressive European knows to be among the best imported fruits should be in its native land a beloved fruit and foodstuff more than any other. It is, however, a fact that everything which humans can obtain in abundance and cheap, is little appreciated.

The reason is perhaps the common ignorance of the value of fruit as food. As long as fruit is only looked upon as a luxury or delicacy, we shall not know real national health.

The value of grapes for bodily health is much better known than that of pineapples. In upper Italy (i.e., Meran) whole places have been converted into Grape-Spas, certainly not to their disadvantage nor of that of their visitors. A cure like this takes from three to four weeks, during which time one consumes as many grapes as possible (mostly the juice of freshly pressed grapes) together with a diet which differs greatly as regards to quantity and nature of meals partaken up to that time.

Those who once have known a thoroughly conducted grape-cure have become convinced adherents to it. Purer and fresher blood and a much better general condition is the result.

Many women go to the Grape-Spas for the improvement of complexion only (the powder-puff takes a back seat), not to mention the so much desired slim line. Health and beauty undeniably go together. Doubtless the grape-cure has become fashionable.

Many explicative treatises by judicious doctors have been written about this matter. It is, however, a mistake to think that only grape-cures can bring this result. The reason why grape-cures are specially good is that the grapes have a very high percentage of juice which, as "drink" cure, can be taken without overloading the stomach.

In this case the full-ripe pineapple can compare favorably with the grape without considering, besides, that pineapple as a pure tropic fruit is of a much higher value, primarily as blood purifier.

A medium size pineapple, freshly pressed, gives at least two large glasses of juice, which can be produced in a primitive way with the hands. If the mash is put through a sieve, the juice will be found to be nearly clear.

A"pineapple-drink-cure" is much less expensive than a "grape-drink-cure." For a pineapple-drink-cure here in Singapore, the so-called Sawarak pineapple is the best to use. They can be obtained in large quantities from the local markets. Pineapples should be transported with much care, for not only are they among the most valuable fruits but are among the most delicate as well.

A good pineapple must be neither too ripe nor too unripe, which is a little bit difficult to see for the uninitiated, as the color of the peel deceives in most cases. In a little while, however, one will be able to find the right fruits by the acquired taste.

Fruits that are not perfect must be refused; i.e., too ripe(gold-brown), too unripe (very white and without sugar-markings), or badly transported (waterclear

bruises), as these often spoil the taste of the whole fruit and for this reason are worthless from the health point of view. Pineapples which are too large are mostly worthless, as it is very seldom that they indicate the right ripeness.

The juice of two or three freshly pressed-out pineapples, drunk at those times at which the body, owing to the adopted diet, is fully absorbent, will show wonderful improvement in the human health. The freshly pressed-out juice must not be allowed to stand for long as it shows symptoms of fermentation after one-half hour.

The pineapple juice enjoyed at the right time not only adds to the blood important substances, but it cleans the body also of all assimilation arrears, which is very essential and does not always happen without a crisis (Halcrisis). Therefore, it is advisable to obtain the advice of an experienced person, especially if it concerns a person laden with morbid matter.

The pineapple has in its native country most unjustly been relegated to a back place as a human food. It is there believed that should it be eaten in specified months, it is provocative to malaria. But just the opposite is the case.

The disposition of a person, that is, the condition of his blood, is the decisive factor for susceptibility to malaria. But with just a pineapple drink cure, the blood will be exceptionally improved.

Healthy, strong blood (number of the red blood corpuscles) is the best equipment against all forms of illness. The natural cure for nearly all forms of illness puts a purer and improved blood as a first requirement, which is certainly nothing new. The conclusion to be derived hereof should not be difficult.

The result of a pineapple-drink-cure, as already stated, does not depend only on the kind or the quantity of the consumed juice, but on the kind and quantity of the foodstuffs partaken as well, which last must be adjusted dietetically to the drink-cure, and therefore depends in the first place on the correct adjustment of diet and drinkcure.

Real health is often to be obtained cheaply, if really wanted.

Philippine Pina Cloth Industry

By TROADIO MILLORA
On Staff of Philippine Journal of Commerce

The pineapple *Ananas comosus* (Linn.-Merr.) was introduced into the Philippines from Mexico by the Spaniards at an early date, and in some islands, particularly in parts of Palawan, it has become thoroughly naturalized. The pineapple plant is now widely scattered throughout these islands, where in many places it grows and flourishes without any attention. In some places it is cultivated for its fruits, such as in the Province of Bukidnon, where large pineapple plantations have been established as a source of supply for the Philippine Packing Corporation, a large pineapple cannery, at Bogo, Oriental Misamis; and in others, partly for the fruits and partly for the fibers, such as in the Provinces of Samar, Occidental Negros, Tayabas, Sorsogon, Bulacan, Leyte, Cebu, Iloilo, and Capiz.

A comparison of our soil and climate with those of pineapple-growing countries in other parts of the world, and a consideration of the behavior of the pineapple in the Philippines, give assurance that with proper care the pineapple will succeed equally well in many parts of the Archipelago.

Textile fibers, much valued for their fineness, are obtained from the leaves of the pineapple. When grown for fibers,

pineapples are closely crowded in planting, the object being the production of long leaves. It is customary to take off the fruit before maturity, so that the leaves may be more fully developed.

Foreman says in his "Philippine Islands" that the weaving of piña and sinamay was taught to the natives by a Spanish priest about the year 1595. At present it is only in the Provinces of Iloilo and Capiz where pineapple fibers are extracted and woven into cloths on a fairly commercial scale. The industry is also found, although on a minor scale, in the Provinces of Batangas, Rizal and Bulacan, and, probably, in some other places where the pineapple thrives.

According to Volume V of the 1918 Census, there were only three piña-cloth establishments, all being located in Calivo, Capiz Province, and capitalized at 974 pesos. The value of raw materials used by these concerns was 2,769 pesos, and the output was valued at 4,860 pesos. As these figures represent only the value of the piña cloth produced in one town, it is readily seen that the total production of piña textiles in the Philippines must necessarily be much more than that amount.

It is believed that the retardation of the development of the industry may be attributed to the fact that the production of piña fibers, although very simple, is exceedingly tedious. For this reason only a few people are engaged in extracting the fibers for the market. In the words of Charles Richards Dodge, Special Agent of the U. S. Department of Agriculture, who in 1893 investigated the possibilities of introducing the industry in Florida and other parts of the United States, "naturally such tedious processes could never be employed were the industry established commercially."

The work of extracting the fibers begins with the cutting of the leaves, which is done close to the trunk. When preparing the fiber of the pineapple the leaves must be manipulated in the green state, as nothing can be done with them when dry. The sharp spines on both edges are cut off, and the fibers are extracted by removing the pulp with or without the aid of some kind of labor-saving device.

One of the extraction methods practiced in the Philippines is by the use of a broken plate, large seashell, etc. With any of such materials, the pulp is scraped off from the leaf until only the fibers remain. This is a very slow and the most primitive method of extracting the fibers.

Another method is by the employment of an ordinary bolo. In this, while one hand is pressing down tightly a leaf with the cutting blade of the bolo, the other draws or pulls the leaf, thus removing the pulp. This process is not only difficult but also wasteful, because many fibers are taken off with the pulp by the sharp bolo.

A third procedure in use is by burying the leaves in the ground until the pulp decays, and then washing the fibers. This means of extraction is seldom used.

The most advanced piña-fiber extraction process in vogue in the Philippines is done with the aid of a simple crude labor-saving device, which can easily be constructed by any one. Only two boards are needed, one long and the other short. The long board is fastened strongly to two posts at each end. The short one must be sufficiently heavy and should rest firmly and immovably on the long board. In the long board, along which the short one rests, is sunken a rectangular iron bar extending beyond the end of the short board. Between the short board and the iron bar there is a narrow opening. Through this aperture the leaf is drawn or pulled hard, then thrown back and drawn again. This drawing of the leaf through the opening is repeated until all the pulp is removed.

After the pulp is entirely removed the fibers are washed until all the greenish substance disappears. This washing may take considerable time, and sometimes a wooden comb is necessary to

remove this greenish coloring. After washing, the fibers are spread in the sun on bamboo poles until thoroughly dry.

According to Spon, the Chinese method of cleaning the fiber is as follows: "The first step is the removal of the fleshy sides of the leaf. A man sitting astride a narrow stool extends on it in front of him a single leaf, one end of which is held beneath him. He then, with a kind of two-handled bamboo plane, removes the succulent matter. Another man receives the leaves as they are planed, and with his thumb nail loosens the fibers about the middle of the leaf, gathers them in his hand, and by one effort detaches them from the outer skin. The fibers are next steeped in water, washed, and laid out to dry and bleached on rude frames of split bamboo. The processes of steeping, washing, and exposing to the sun are repeated until the fibers are considered properly bleached."

The pineapple furnishes a fiber which for fineness and strength rivals any in existence. Dr. D. Morris, at one time assistant director of the Royal Kew Gardens in England, states that the fiber is finer and stronger than that yielded by any other plant. Although very fine, the process of bleaching, by destroying the adhesion between bundles of fibers, renders it so much finer that it can be spun like flax. In the East Indies, where the pineapple was introduced as early as 1600, the fiber is extensively used in the manufacture of the delicate fabric called "piña," as well as for cordage, according to Dodge. In the Rungpore district of India, the same authority says, the fiber is much used by the shoemakers for twine.

Charles Richards Dodge gives an interesting account of the qualities and uses of the pineapple fiber in his "Report on the Leaf Fibers of the United States," submitted in 1893 to the U. S. Department of Agriculture. He also describes a certain kind of wild pineapple fiber utilized in some countries for textile purposes. The following excerpts are taken from his comprehensive work:

"The fiber of *Ananas sativa* is very fine and soft, the filaments being flexible and very resistant. They yield readily to treatment in the alkaline bath and are easily subdivided, especially when subjected to trituration.

"The isolated fibers are very fine, of a tolerably regular diameter from one end to another, but of very different size. The interior canal, which is very perceptible in the largest, is not so in the smaller ones. They are very flexible, curling and twisting readily under mechanism. The points are rarely sharp, and gradually become slender. They are rounded at the end, or, rather, blunt.

"It is claimed for pineapple fiber that constant immersion in water does not in the least injure it, and the natives of the East Indies increase this property by tanning it, though it is probably at the expense of strength. In tests of strength pineapple fiber exhibits superior tenacity. The fiber from Singapore bore a strain of 350 pounds against 260 pounds for New England flax. This last-named has been proved equal and in some respects superior to best English hemp. In the Journal of the Agricultural Society of India (Vol. III, p. 182), there is a record of a rope of pineapple fiber, 3¼ inches in circumference, standing a strain of 5,700 pounds before breaking.

"Piña is considered to be more delicate in texture than any other known to the vegetable kingdom. It is woven from the untwisted fibers of the *Ananas* leaf, after they have been reduced to extreme fineness, and after the ends have been glued (?) together to form a continuous thread.

"Wild pineapple fiber is extracted from the *Bromelia sylvestris,* and while it is fine and silky, and very white in color when properly prepared, it is not as good a fiber as the preceding. This species is found abundantly throughout the tropics, and there are no collections that do not contain superb samples of its fiber. Specimens brought by me from Paris, presented to the Mexican commissioner general, are among the finest I have seen, averaging 4 feet in length, the fiber being soft, white and brilliant.

"The wild pineapple abounds on the rocky hills of the West Indies and particularly Jamaica, where the plants are used as hedges and fences. Its leaves are steeped in water by the natives, and, after beating with a wooden mallet, yield a strong fiber. It is in common use for cordage on the island of Santo Domingo, and is favorably mentioned by Dr. Parry in his report.

"The leaves from which the fiber is obtained are from 1½ to 3 inches in width and 5 to 8 feet long. They are quite thin and are lined

with a fine, tough fiber, which some authorities consider a superior substitute for flax. In portions of Mexico the Bromelia is cultivated for its fiber, which is described as very fine, from 6 to 8 feet in length, and from its fineness and toughness commonly used in belt-making works. It also finds application in the manufacture of many articles, such as bagging for baling cotton, wagon sheets, carpets, etc., besides forming a valuable material for making cordage, nets, hammocks, and similar articles of common use. In Mexico, the leaves were formerly subjected to the slow and laborious process of hard scraping, but, I am now informed, are cleaned by machinery, as there is a considerable demand for the product.

"On the Isthmus of Tehauntepec it is used by the natives in the fabrication of thread, cordage, mats, bagging, clothing, and for hammocks, and the fiber is sometimes made into paper. It is also manufactured into cloth by the Spaniards for hammocks. Specimens of Bromelia fiber from British Honduras were brought to the notice of the Royal Society of Arts in 1857, and from examinations then made it was ascertained that each fiber contained from five to twelve or more filaments held together by gummy matter capable of being dissolved by proper processes. Specimens had been passed over the comb or hackle of a flax mill, and had been pronounced by the most experienced flax spinners of England to be greatly superior to Russian flax, and approaching the best description of Belgian in capability of application in the finest textile fabrics.

"It is said that the more mature the plant the coarser and longer the fiber, so with this knowledge it is an easy matter to select just the quality of fiber desired. The plants are armed with spines or thorns used by the natives for needles and pins—though these disappear in cultivation.

"Microscopically the fibers of Bromelia differ from those of Ananas. The interior canal is much more apparent and the walls thinner. The fibers often present great inequalities in the diameter of the same specimen as well as in the thickness of the walls."

For cloth-making purposes, the fibers, after they are sorted as to fineness, are knotted together in the same manner as the abacá fiber or the knotted hemp called locally "sinugot." The knotted fibers are then spun on spools by means of a spinning wheel. The native spinning wheel is generally made of bamboo or rattan, attached to a wooden support with an iron peg where the wheel rotates. It is usually run by hand.

The weaving of piña cloth is done in the ordinary hand loom. In a few out-of-the-way places, the weavers still use a sort of primitive loom, called in the Visayan dialect "sicad." Piña fibers are woven into cloth either exclusively or in combination with other textile materials. The usual arrangement is to make the warp of either silk or fine abacá and the woof of piña. The pure piña cloth is a delicate, silky fabric, much used in making exquisite dresses, embroideries, centerpieces, handkerchiefs, etc.

Of late there has appeared in the market piña cloth, called "Piñatex," which is suitable for men's suits. The fabric, produced in Iloilo, appears glossy and durable. A piece of this cloth about six meters in length, sufficient for one suiting, is being retailed at around 5 pesos. It seems that some linen yarns enter into the material.

Piña cloth weaving is carried on principally in the towns of Banga, Calivo, Ibajay, and New Washington in Capiz Province, and in Jaro and Dumangas in the Province of Iloilo. The cloth is exported to Manila and foreign countries in limited quantities.

There appears to have always been a very small demand for piña cloth in the Philippines. Piña is a very fine and durable textile, but on account of its excessively high price it is considered here as an object of luxury. Only moneyed people, it seems, can afford to buy it as it is more expensive than silk.

The production of piña cloth in the Philippines is inappreciable indeed. There is no organized capital exploiting the industry in this country. It is only intermittently and sporadically woven by some women whenever they find that there is a demand for the product in the market or when orders are placed for certain quantities of piña cloth.

The buyers of Philippine piña are the United States, Hawaii, Italy, China, Japan, and Canada.

The biggest problem of the industry here as elsewhere is quantity production

of the fiber at economical cost. The machine question enters largely into the problem, and a contrivance to fill the need has as yet not been found. True, machinery has been employed in some countries to produce the fiber, there being several inventions for the purpose, but there is not a machine invented which can produce the fiber economically and on a commercial scale.

As the leaves are small, a quantity would need to be cleaned at one feeding of the machine, to make it pay. The Van Buren machine, which is employed for extracting sisal hemp, its capacity being about 150 to 200 pounds of dry fiber per day of ten hours, was tried by Dodge and Munroe for cleaning pineapple fiber in Florida. It was found that "while it turned out a superb product, it would be wholly inadequate for the work from the commercial standpoint, as only two or three leaves could be fed in at a time."

Concerning this phase of the problem, Dodge says: "Estimating 10 leaves to the pound, there would be over 22,000 leaves to the ton, which would produce from 50 to 60 pounds of fiber. The Sanford and Mallory machine referred to (by Spon), which is claimed to be capable of cleaning 5,000 to 8,000 leaves per day, would at this rate clean only 12 pounds of fiber in a day, which would make the product somewhat high-priced. Were the fiber used in the manufacture of delicate fabrics, there is no doubt that it would command a price considerably higher than the product of the other leaf fibers described in this report."

In spite of this drawback, however, the industry is capable of considerable expansion, were organized capital to go in for it at all hazards and develop it consistently and persistently. In "A Survey of Economic Conditions in the Philippines" submitted to the Governor-General of the Philippines by Lyman P. Hammond in 1928 it is pointed out that one of the industries which offer interesting possibilities is the "further processing of the many different fibers found here for textile purposes, and *development of an organized weaving industry* that will profitably employ the undoubted talent in textile design and fabrication shown by the product of the small handlooms found in so many of the homes." Hammond observes:

"One cannot travel about the Philippine Islands without being impressed by the possibilities of the textile fibers here. Abacá, maguey, as well as the *beautiful piña,* and many other materials are abundant.

"In many of the localities visited, notably the Ilocos Provinces, southern Luzon, and the *southern coast of Panay,* there seems to be a hand loom in almost every household. *The textiles produced on these looms appeared not only strong and durable, but they also, in most instances, were most attractive in design and composition of figure and color. Without doubt there is inherent in the Filipino people an artistic talent which,* it seems to me, *might, under sufficient encouragement, be most profitably commercialized.*

"Research work in an effort to produce a textile wholly or partly from native products seems well worth the expenditure of considerable effort here. Possibly the fabrics or even the yarns would have to be composed partly of cotton or other fibers, and without doubt the *native fibers would have to be processed to a point considerably beyond present practice* to produce such a textile, but a sustained and scientific effort to produce a textile at least suitable for domestic requirements, and possibly of *such novel characteristics as to command a substantial export market,* seems justified by the abundance in which fibrous plants occur in the Philippines." (Italics are ours.)

Dr. Juan T. David, who was sent to the Lowell Textile Institute, as government pensionado, states that no doubt was entertained by his professors that piña could be spun in the flax system and the yarns woven in power looms.

In short, the needs of the industry may be stated in three words: research, organization, and capital. The piña textile industry might be benefited by the recent enactment of the Philippine Legislature appropriating 680,000 pesos for the promotion and development of Philippine industries. In the meantime, to make any piña cloth business worth

while it is necessary to establish a strong export organization with sufficient financial resources to enable it to have some reasonable control of a steady production and to undertake an educational or advertising campaign in the United States, which is practically the sole market for the product at present.

The Pan-Pacific Science Council in Manila

Dr. H. H. Steinmetz, president of the Pan-Pacific Science Council in Manila, recently visited the Honolulu Science Council and spoke at the weekly Friday science dinner of the valuable work being done by the group in the Philippines. "Although only three months old, our group, which has Friday dinner discussions as you have here, I see two results of our meetings that are very practical.

"In one case the Department of Agriculture asked a group of young men to tell of their work in the preparation of fibers, hemp in particular. At that meeting it was shown that the most useful purpose of hemp was in the manufacture of sugar sacks. It was found that the sacks prepared for sugar and copra by the Japanese in Davao were too stiff and hard to be suitable, and that it was necessary to continue buying jute sacks from India. The head of the department stated that through experiments they had learned a safe process of treating the fibers to make them as useful and durable as those from India.

"The Spanish Consul in Manila who happened to be at this meeting then stated that he had just received a letter from his government asking him to investigate the matter of sacks. He later reported the facts brought out in the discussion, and the result was a large order of sacks given by the Spanish government to the Philippine Islands.

"A second practical result happened in the field of nutrition. As you know, it is difficult to get milk in the Philippines. Dr. ..... spoke, at our first meeting, of soy bean milk from Manchuria. A firm has recently been organized in Manila to exploit this possibility.

"My own particular interest is medicine, and I am now on my way to Vienna to make a special study of the early diagnosis of cancer. The British government requires its men employed in India to have a secondary interest because when retired from service after 35 years the men with only a primary interest rapidly deteriorate, mentally and morally. I have often thought that the stimulating effects of learning what other men are doing through these science council discussions, is one of the greatest benefits that can come to us. I congratulate you on having Mr. Alexander Hume Ford as your leader. He often says scientific men are timid and need a press agent. I know it is true that the government scientists are doing many things in health lines of which the public know nothing. All through the Pacific we can popularize the work of these men, not for the sake of the men, but for the sake of the public."